IN THE CLAIMS:

1. (currently amended): A magnetoresistive read/write memory, with a plurality of multivalue storage cells, each storage cell having two intersecting electric conductors and a layer system comprising magnetic layers located at the intersection of said electric conductors, wherein said layer system is designed as a multilayer system with two or more magnetic layers, at least two, but a maximum of all said magnetic layers having a magnetization direction in that can be set independently of one another, said magnetization direction in [said individual layers] an individual layer of said magnetic layers being changed by the electric current flowing through said electric conductors, and further comprising in each case a tunnel dielectric between [two adjacent magnetic layers] each two magnetic layers that are next to each other, and wherein said two or more magnetic layers of the multivalue storage cell are sandwiched between said two intersecting electric conductors.

2. (previously amended): The magnetoresistive read/write memory as claimed in claim 1, in which said magnetization directions that can be set independently of one another in said individual layers can be set via different current intensities.

3. (previously amended): The magnetoresistive read/write memory as claimed in claim 1, in which said electric conductors are designed for high current densities.

4. (previously amended): The magnetoresistive read/write memory as claimed in claim 1, in which said magnetic layers are formed from a ferromagnetic material.

5. (previously amended): The magnetoresistive read/write memory as claimed in claim 1, in which said intersecting conductors are aligned orthogonally to one another.

6. (previously amended): The magnetoresistive read/write memory as claimed in claim 1, in which said tunnel dielectric has a thickness of 2 to 3 nm.

7. (currently amended): A method of writing to a magnetoresistive read/write memory [as claimed in claim 1], the magnetoresistive read/write memory comprising a plurality of multivalue storage cells, each storage cell having two intersecting electric conductors and a layer system comprising magnetic layers located at the intersection of said electric conductors, wherein said layer system is designed as a multilayer system with two or more magnetic layers, at least two, but a maximum of all said magnetic layers having a magnetization direction in that can be set independently of one another, said magnetization direction in an individual layer of said magnetic layers being changed by the electric current flowing through said electric conductors, and further comprising in each case a tunnel dielectric between each two magnetic layers that are next to each other, and wherein said two or more magnetic layers of the multivalue storage cell are sandwiched between said two intersecting electric conductors, the method comprising [having the following steps]:

a) impressing a variable electric current into said two electric conductors and, as a result, producing a magnetic field; and

b) setting said magnetization direction in said individual magnetic layers of said multilayer system via the field strength of said magnetic field produced, said magnetization directions in said individual layers being set independently of one another via respectively differently high requisite field strengths, in such a way that said magnetization directions are set first in those layers which need the highest field strength for this purpose and that said magnetization directions are then set in those layers which respectively need a lower field strength for this purpose.

8. (previously amended): The method as claimed in claim 7, in which said different field strengths acting on said layers are produced by currents of different magnitudes being impressed into said conductors.

9. (previously amended): The method as claimed in claim 7, in which said different field strengths acting on said layers are produced by means of a different physical spacing of said layers in relation to said conductors.

10. (previously amended): The method as claimed in claim 7, in which the setting of said magnetization directions in said layers on the basis of field strengths of different magnitudes are influenced by the layer material and/or the layer thickness and/or the layer morphology.

11. (currently amended): A method of writing to a magnetoresistive read/write memory [as claimed in claim 1], the magnetoresistive read/write memory comprising a plurality of multivalue storage cells, each storage cell having two intersecting electric conductors and a layer system comprising magnetic layers located at the intersection of said electric conductors, wherein said layer system is designed as a multilayer system with two or more magnetic layers, at least two, but a maximum of all said magnetic layers having a magnetization direction in that can be set independently of one another, said magnetization direction in an individual layer of said magnetic layers being changed by the electric current flowing through said electric conductors, and further comprising in each case a tunnel dielectric between each two magnetic layers that are next to each other, and wherein said two or more magnetic layers of the multivalue storage cell are sandwiched between said two intersecting electric conductors, the method comprising [having the following steps]:

a) impressing a defined item of data into said individual layers of said multilayer system in such a way that the item of data is first impressed into that layer which needs the lowest field strength to set said magnetization direction, and that the item of data is then impressed into said layers having the respectively next higher requisite field strength; and

b) detecting a possible information change in said layer or said layers on the basis of said impressed defined item of data.

12. (previously amended): The method as claimed in claim 11, in which the detection of a possible information change in said layer or said layers is carried out by measuring the electrical resistance.

13. (previously amended): The method as claimed in claim 11, in which the detection of a possible information change in said layer or said layers is carried out via detection of current and/or voltage pulses.

14. (previously amended): The method as claimed in claim 11, in which the detection of a possible information change in said layer or said layers is carried out before and after said impression and/or during said impression of said specific item of data into said layer or said layers.

15. (previously amended): The method as claimed in claim 11, in which said item of data with respectively the same value is successively impressed into all said layers.

16. (previously amended): The method as claimed in claim 11, in which said item of data which belongs to an alternating algorithm is impressed successively into said layers.

17. (previously amended): The method as claimed in claim 11, in which the results during said detection of a possible information change for each layer are intermediately stored, at least temporarily, in a storage device.